



HISTOPATHOLOGICAL SPECTRUM OF RENAL LESIONS IN AUTOPSY AT A TERTIARY CARE CENTRE OF AHMEDABAD: A RETROSPECTIVE STUDY

Pathology

Dr. Kavleen Patel*	Third year resident, Department of Pathology, GMERS Medical College and Hospital, Sola, Ahmedabad. *Corresponding Author
Dr. Bharkha Harwani	Third year resident, Department of Pathology, GMERS Medical College and Hospital, Sola, Ahmedabad.
Dr. Hyomshi Bhavsar	Third year resident, Department of Pathology, GMERS Medical College and Hospital, Sola, Ahmedabad.

ABSTRACT

Kidneys are vital organ of the body with multiple functions. Renal diseases often go unnoticed during the life time of the subject. The practicing pathologist should be aware of the frequency and spectrum of renal pathology that may be present in autopsy kidneys, and implement a systemic approach to their evaluation. The objective of this study is to identify various histopathological lesions of kidney and its co-relation with other organ lesions, age and gender. A retrospective study was conducted in the Department of Pathology, GMERS Medical College and hospital Sola, Ahmedabad for 1 year including autopsies with kidney specimens in well preserved state and excluding autopsies without kidney or those which had kidney in autolysed state. A total of 220 autopsy cases were studied out of which 31 were female and 189 were male. Maximum number of cases were in 41-60 age group i.e. 92 cases. 126 cases had close to normal histology. Pathological findings were found in 94 cases, among which maximum cases were of Glomerulosclerosis. Other findings were of Acute tubular necrosis, Chronic pyelonephritis, Arteriosclerosis, Diabetic nephropathy, Tuberculous granuloma, Focal segmental glomerulonephritis, Metastatic Non-Hodgkins Lymphoma and simple cyst. Myocardial infarction was the most commonly associated another organ lesion. Studying the pathology of renal lesions can provide useful information in preventing and treating chronic renal diseases ultimately helping in patient care and management.

KEYWORDS

autopsy, kidney, age, glomerulosclerosis.

INTRODUCTION:

Kidneys are vital organ of the body with multiple functions like excretory function, acid base balance, maintenance of salt, water metabolism and blood pressure through rennin angiotensin mechanism along with haematopoiesis by producing erythropoietin¹. The term "autopsy" is derived from the Ancient Greek word autopsy, means "to see for oneself", autos ("oneself") and opsia ("eye"). Autopsy aids to the knowledge of pathology by unveiling the rare lesions which are a source of learning from a pathologist's perspective^{2,3}. William Boyd in his unimitable style wrote "Pathology had its beginning on the autopsy table"⁴. Renal diseases often go unnoticed during the life time of the subject. Histologic evaluation of autopsy kidneys may be the first opportunity to identify renal lesions at microscopic level⁵. A wide spectrum of renal pathology namely diabetic nephropathy, chronic pyelonephritis, acute tubular necrosis, tuberculous inflammation and many more has been observed in autopsy cases. The practicing pathologist should be aware of the frequency and spectrum of renal pathology that may be present in autopsy kidneys, and implement a systemic approach to their evaluation. The objective of this study is to find out various histopathological lesions of kidney that are identified grossly and microscopically in autopsies and its co-relation with other organ lesions, age and gender. This can be helpful in creating awareness to general public about how these lesions, which often go unnoticed during life time can have a significant contribution to the cause of death.

AIMS AND OBJECTIVES:

To find out various histopathological lesions of kidney that are identified grossly and microscopically in autopsies and its co-relation with other organs lesions, age and gender.

MATERIALS AND METHODS:

A non-interventional retrospective record-based observational study was conducted on autopsies in the Department of Pathology, GMERS Medical College and Hospital Sola, Ahmedabad for 1 year starting from 1st January 2024 to 31st December 2024.

Inclusion Criteria:

All the autopsies which included specimen of kidney in well preserved state, received by the Pathology department during above mentioned period were included in the study, irrespective of age, sex and cause of death.

Exclusion Criteria:

All the autopsies which lacked the specimen of kidney or had the

specimen of kidney in autolysed state were excluded from the study.

The details about age, gender and clinical history of the deceased are obtained from the requisition form. The received specimens of kidney were fixed in 10% buffered formalin. Weight and measurements of the specimen were recorded. To rule out any gross pathology, capsule, external surface and on cut section, the cortex, medulla and renal pelvis were examined. Sections which included cortex and medulla were taken from the kidney and additional sections from any grossly identifiable abnormal areas were taken for microscopic examination. The sections taken were then subjected to processing and paraffin embedding. Routine haematoxylin and eosin staining was performed. Special stains like Ziehl-Neelsen and Per-iodic Acid Schiff staining were performed in indicated cases.

RESULTS:

A total of 308 autopsies were received during the period of 1 year from 1st January 2024 to 31st December 2024. Out of 308 autopsies, specimen of kidney was received in 247 autopsies, of which 27 were autolysed. Hence, 220 autopsy cases were included in our study. Out of 220 cases, 31 were female i.e. 14.1 % and 189 were male i.e. 85.9%. Hence, the male to female ratio is 6.1:1.

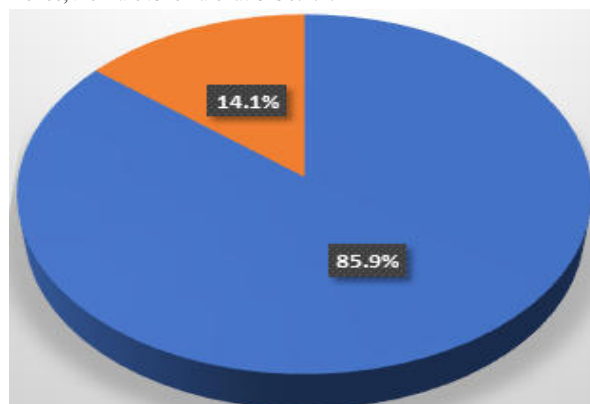
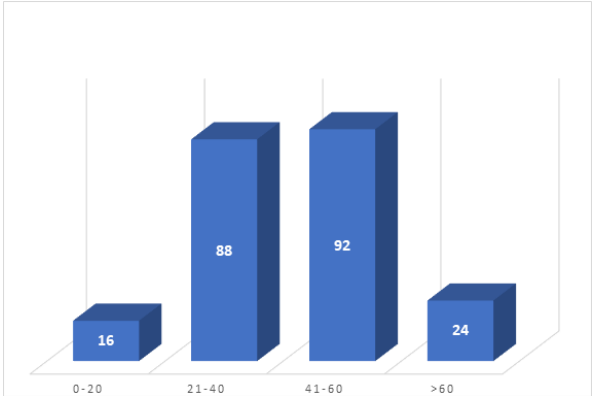


Chart 1: Male to Female Ratio

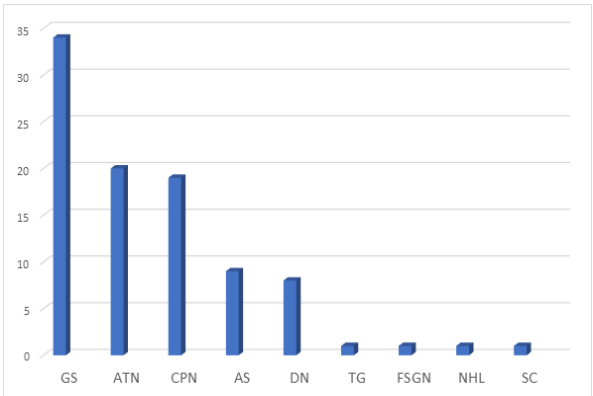
According to age, the autopsy cases were divided into 0-20 years (young patients), 21-40 years (young adults), 41-60 years (middle age) and >60 years (old age). The 0-20 years age groups consisted 16 cases,

21-40 years age group consisted of 88 cases, 41-60 years age group consisted 92 cases and > 60 years age group consisted 24 cases. Maximum number of cases were in middle year age group i.e. 92 cases (41.8%).



Graph 1: Distribution of cases according to age group

Out of 220 cases, 126 cases (57.3%) had close to normal histology. Pathological findings were found in 94 cases (42.7%). Among 94 cases, maximum number of pathological findings were of Glomerulosclerosis (GS) i.e. 34 cases (36.2%). Other findings were of Acute tubular necrosis (ATN) (20 cases), Chronic pyelonephritis (CPN) (19 cases), Arteriosclerosis (AS) (9 cases), Diabetic nephropathy (DN) (8 cases), Tuberculous granuloma (TG) (1 case), Focal segmental glomerulonephritis (FSGN) (1 case), Metastatic Non-Hodgkins Lymphoma (NHL) (1 case) and simple cyst (SC) (1 case).



Graph 2: Pathological Findings

Table 1: Correlation Of Pathological Findings With Age Group And Gender.

Pathological Findings	AGE GROUP							
	0-20		21-40		41-60		>60	
	M	F	M	F	M	F	M	F
Normal	7	6	50	13	45	1	4	0
GS	0	0	5	3	17	1	8	0
ATN	0	2	10	2	5	0	1	0
CPN	0	0	2	0	11	0	5	1
AS	0	0	2	0	5	0	2	0
DN	0	0	0	0	5	1	1	1
TG	0	0	1	0	0	0	0	0
FSGN	1	0	0	0	0	0	0	0
NHL	0	0	0	0	0	0	1	0
SC	0	0	0	0	1	0	0	0

Associated other organ lesions found in our study were, 42 cases of Myocardial infarction (MI), 20 cases of Pneumonia (PN), 18 cases of Tb granuloma in lung (TGL), 8 cases of Steatohepatitis (SH), 7 cases of Liver Cirrhosis (LC) and other miscellaneous findings like, 1 case of Right bronchus carcinoma (RBC), 2 cases of Adenocarcinoma of lung (ACL), 1 case of Tuberculous Granuloma in lung, liver and spleen, 1 case of Squamous cell carcinoma of neck (SCC), 1 case of Metastasis of NHL in all the organs and 1 case of Adenocarcinoma of Liver.

Table 2: Correlation Of Pathological Findings In Kidney With

Other Organ Lesions.

Pathology in Kidney	Other organ lesions					
	MI	PN	TGL	SH	LC	Miscellaneous
Normal	15	11	9	3	3	RBC, ACL
GS	10	3	5	3	1	Adenocarcinoma of Liver
CPN	5	4	2	1	1	0
ATN	5	1	0	0	1	0
DN	5	1	0	1	0	0
AS	2	0	1	0	1	ACL, SCC
TG	0	0	1	0	0	TG in lung, liver & spleen
NHL	0	0	0	0	0	Metastasis of NHL in all organs
FSGN	0	0	0	0	0	0
SC	0	0	0	0	0	0



Image 1: Scarring and contracted kidneys in chronic pyelonephritis

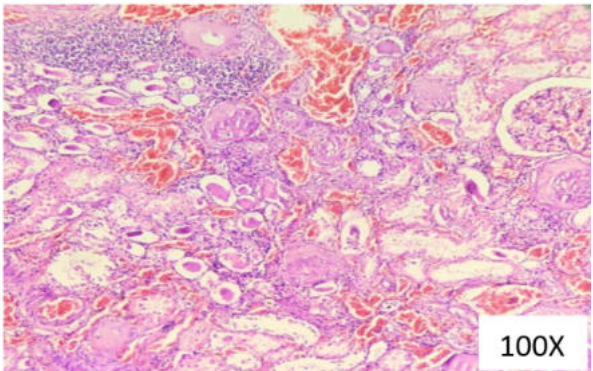


Image 2: Thyroidisation of tubules, glomerulosclerosis, inflammatory infiltrates and congestion in chronic pyelonephritis.

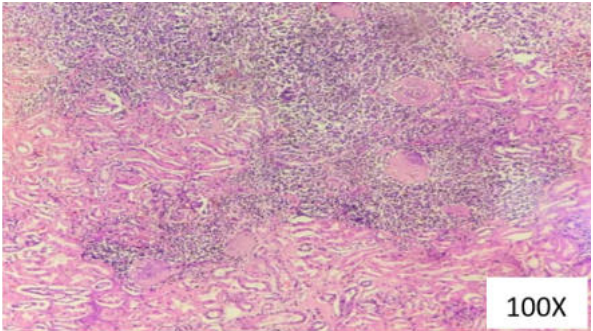


Image 3: Infiltration of lymphocytes in case of metastatic Non-Hodgkins Lymphoma

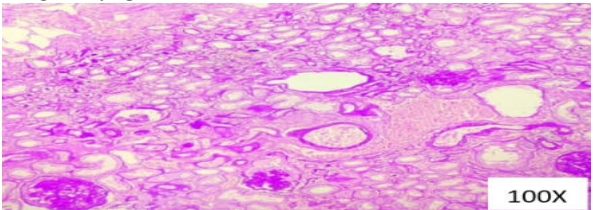


Image 4: PAS stain, Kimmel stein Wilson nodules in Diabetic nephropathy

DISCUSSION:

In our study female constituted 14.1% of study population and male constituted 85.9%. This was similar to study done by Neha et al.⁷ in which female constituted 20.6% and males constituted 79.4%. In study done by Puri A et al.⁸ females constituted 30% of study population and males constituted 70%. In study done by Yadav SNS et al.⁹ 64.6% were males and 35.4% were females. While in study done by Kruthi B et al.¹⁰, male and female both constituted equal proportion in study population i.e. 50 %. This difference can be due to difference in number of study population which is 220 in our case while it was 38 (a smaller number of study population) in Kruthi B et al.¹⁰. Also in our study maximum number of cases were in age group 41-60 years (middle year age group) i.e. 41.8% which was similar to study done by Neha et al.⁷ which too had maximum number of cases in 41-60 years age group (37%). In our study, definitive pathological findings were found in 42.7% cases. In study done by Khare P et al.¹¹, definitive kidney lesions were found in 159 cases out of 417 cases i.e. 38.13%. In our study the most common lesion encountered was Glomerulosclerosis (36.2%) followed by Acute tubular necrosis (21.3%). While in study done by Chethan K et al.¹² the most common lesion found was Acute tubular necrosis (35.71%). In study done by Desai K et al.¹³, among glomerular and non-glomerular lesions, most commonly found pathologies were focal glomerulosclerosis and acute tubular necrosis respectively. Both increased dietary protein ingestion and atherosclerotic vascular disease have been mentioned as possible causes of age-related glomerulosclerosis. It has been suggested that increased glomerular capillary pressure and flow resulting from high dietary protein intake, may lead to glomerulosclerosis and decreased renal function associated with ageing.¹⁴ In our study, in lesions of Glomerulosclerosis, Chronic pyelonephritis, Arteriosclerosis, Diabetic nephropathy and Simple cyst maximum number of cases are found in age group of 41-60 years age. While in Acute Tubular Necrosis and normal findings, maximum number of cases are found in 21-40 years age group. Renal function declines progressively with age. After age 40, renal blood flow falls about 10% per decade. A similar but less marked decline in glomerular filtration rate also occurs.¹⁴

Total 102 associated lesions of other organs were identified out of which 59 were associated with pathology in kidney and remaining 43 were associated with normal kidney. Myocardial infarction was the most commonly associated i.e. 27 cases out of total 59 cases (45.8%). This finding indicates that though atherosclerosis primarily affects heart, it may also have direct or indirect effect on kidney. Also, out of 8 cases of Diabetic nephropathy, 5 cases were associated with myocardial infarction, 1 case with pneumonia and 1 case with steatohepatitis i.e. total 7 out of 8 cases (87.5%) were associated with other organ lesions which highlights the role of diabetes in causing injury to not only kidney but also to other organs contributing significantly in overall morbidity and mortality.

CONCLUSION:

Our study identified a wide spectrum of renal lesions which may have been clinically silent during lifetime but contributed to the cause of death and correlated it with other organ lesions, age and gender. Studying the pathology of such renal lesions can provide useful information in preventing and treating chronic renal diseases ultimately helping in patient care and management.

REFERENCES:

1. Deepthi, K. N., Karamchedu, S., & Apurva. (2020). Histomorphological spectrum of renal diseases: A prospective study for a period of two years. *Annals of Pathology and Laboratory Medicine*, 7(8), A-417–A-421. <https://doi.org/10.21276/APALM.2785>
2. Mulay, P. S., & Khosla, A. (2020). Kidney lesions in an autopsy 3-year study in a tertiary health care hospital. *Journal of Medical Science and Clinical Research*, 8(2), 878–883. <https://dx.doi.org/10.18535/jmscr/v8i2.149>
3. Kaur, A., Bodal, V. K., Garg, P., & Aggarwal, A. (2018). Histopathological spectrum of kidney lesions in autopsy: A study of 100 cases. *Journal of Medical Science and Clinical Research*, 6(2), 962–966. <https://dx.doi.org/10.18535/jmscr/v6i2.150>
4. Patel, S., Maurya, S., & Rajalakshmi, B. R. (2020). Autopsy findings in kidney: A plethora of lesions for a histopathologist. *Indian Journal of Forensic Medicine and Pathology*, 13(4), 542–548. <https://doi.org/10.21088/ijfmp.0974.3383.13420.12>
5. Kiyawat, P., Thakur, S. S., Rohit, N., Panchonia, A., & Prapanna, P. (2021). Histomorphological spectrum of renal lesion in autopsy: A 2 year study in tertiary care hospital. *International Journal of Health and Clinical Research*, 4(17), 102–107. <https://ijhcr.com/index.php/ijhcr/article/view/2776>
6. Henriksen, K. J. (2017). Assessment of kidneys in adult autopsies. *Diagnostic Histopathology*, 23(3), 117–125. <https://doi.org/10.1016/j.mpdhp.2017.03.009>
7. Neha, S., Meera Devi, T. H., Pukhrambam, G. D., & Haricharan, A. (2021). Pathological findings in kidney in medicolegal autopsies: A study. *Indian Journal of Forensic and Community Medicine*, 8(1), 33–38. <https://doi.org/10.18231/ijfcm.2021.007>
8. Puri, A., Garg, P., Tayal, I., Singh, N., & Joshi, R. (2017). Uncommon and fluke pathological discoveries during examination of viscera in postmortem cases: A retrospective study. *Journal of Advanced Medical and Dental Sciences Research*, 5(2), 121–123. <https://doi.org/10.21276/jamdsr.2017.5.2.28>
9. Yadav, S. N. S. (2019). Histomorphological study of kidney lesions in autopsy: An

original eight year study. *IOSR Journal of Dental and Medical Sciences*, 18(5), 50–54.

<https://doi.org/10.9790/0853-1805050504>

10. Kruthi, B., Shilpa, K., & Bharathi, M. (2022). Histomorphological spectrum of kidney lesions in nephrectomies and autopsies in a tertiary care center with an emphasis on primitive neuroectodermal tumor/Ewing sarcoma. *Indian Journal of Pathology and Oncology*, 9(1), 48–51. <https://doi.org/10.18231/ij.jppo.2022.011>
11. Khare, P., Gupta, R., Agarwal, S., Bhatnagar, A., & Anand, R. (2021). Spectrum of renal lesions on autopsy: Experience of a tertiary level institute based on retrospective histopathological analysis. *Cureus*, 13(8), e17064. <https://doi.org/10.7759/cureus.17064>
12. Chethan, K. (2016). Histomorphological spectrum of kidney lesions in nephrectomies and autopsies. *International Journal of Scientific Research*, 5(4), 366–368. <https://doi.org/10.15373/22778179>
13. Desai, K., Mehta, N., & Goswami, H. (2020). Histomorphological spectrum of kidney lesions in autopsy cases. *International Journal of Contemporary Pathology*, 6(1), 29–33.
14. Kasiske, B. L. (1987). Relationship between vascular disease and age-associated changes in the human kidney. *Kidney International*, 31(5), 1153–1159. <https://doi.org/10.1038/ki.1987.84>